§33. CHS Data Acquisition and Analysis System

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CHS data acquisition and analysis systems, the Cinos and the VAX systems have been operated steadily without serious problem in this fiscal year. Total experimental data of 160 Gbytes have been acquired, which is 20 Mbytes/shot and 2.0 Gbytes/day in average. This number is smaller than that of the last year by 12 %. This is because CHS had stopped for three months due to trouble of the coil power supply. The 80 % of the total data has been acquired by the Cinos system. The rest 20% is by the VAX system. However, as the VAX system is getting old troubles are increasing, which are on the magnetic disk, the power supply unit and the terminal device. And we prepared for the Digital Linear Tape (DLT 600Gbyte on compression) drive unit when the old troubles happened.

Major improvements in this fiscal year are as follows. Two types of AD/c modules have been newly installed. One is a 4-channel CAMC high speed, single-end AD/c modules (12bit, 25MHz, 1Mbyte memory/channel) as shown in Fig. 1, which is used for plasma fluctuation analysis by HIBP and HCN laser scattering. The other is a12-channel CAMAC high speed AD/c (12bit, 100KHz, 128K memory/channel) for the plasma fluctuation diagnostic. The Cinos system consists of eleven units, which is the same as that in last year. Six of new AD/c modules are installed on one of the local Cinos units for plasma fluctuation diagnostic.

Fundamental structure of the Cinos system in each unit is the same as in last year. Cinos is the multi computer system and each unit has three computers at present. One of three computers is running by UNIX. Since the load on UNIX computer becomes large, an additional computer module was installed and tested. This new computer has simple Linux operating system with better efficiency than the UNIX one. This Linux is the version of an early stage and has no GUI.

Many mechanical troubles occurred in the VAX system as mentioned above. But such troubles could be coped with by replacing peripheral devices. However, it is anticipated that such troubles will increase from now on. Therefore, the replacement of VAX with Cinos is being requested urgently.

Improvement and solving problems in the Cinos system have been continued. The most serious problem is that the Cinos computer halts when irregular interruption occurs. This problem has lasted for a year. It is found to occur when two or more interruption appear within 10 μ second interval. This is because the Linear Time-Invariant Method (LTIM) of Cinos system cannot resolve two events with such short interval. We have analyzed details of the LTIM, CPU and VME bus timings, then found that it is necessary to have more than 10 μ seconds to complete one set of calculation with LTIM. In order to solve this problem, it is necessary to improve the microcomputer architecture and the speed of the VME bus.

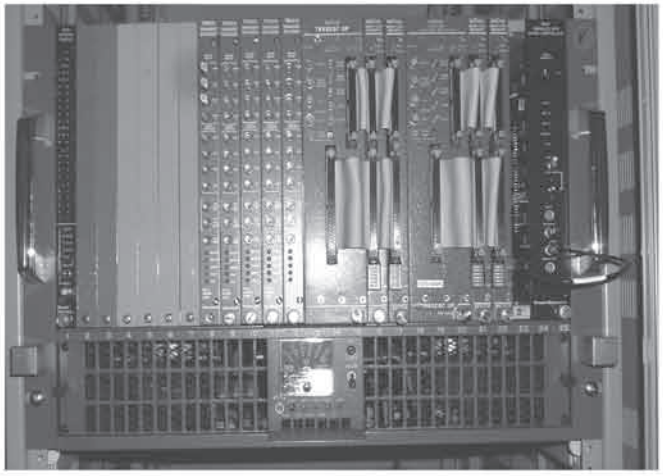

Figure.1. CAMAC fast AD/c modules are newly installed on the Cinos signal processing system.

Reference:

[1] Takahashi, C. et al., Annual report of NIFS, April 1999-March 2000 277(2000)
[2] Takahashi, C. et al., Annual report of NIFS, April 2000-March 2001 298(2001)
[3] Takahashi, C. et al., Annual report of NIFS, April 2001-March 2002 302(2002)
[4] Takahashi, C. et al., Annual report of NIFS, April 2002-March 2003 285(2003)
[5] Takahashi, C. et al., Annual report of NIFS, April 2003-March 2004 297(2003)